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Healthcare utilization and direct cost of giant cell arteritis: a population-based study

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Abstract

Objective—To determine the healthcare utilization and direct medical cost of giant cell arteritis (GCA) in a population-based cohort.

Methods—A well-defined, retrospective population-based cohort of Olmsted County, Minnesota residents diagnosed with GCA from 1982–2009 was compared to a matched referent cohort from the same population. Standardized cost data (inflation-adjusted to 2014 dollars) for 1987–2014 and outpatient utilization data for 1995–2014 were obtained. Utilization and costs were compared between cohorts using signed rank paired tests, McNemar's tests, and quantile regression models.

Results—Significant annual differences in outpatient cost were observed for patients with GCA in each of the first four years (median differences: \$2085, \$437, \$382, \$388, respectively). In adjusted analyses, median incremental cost attributed to GCA over a 5-year period was \$4662.

Compared to matched referent subjects, patients with GCA had higher utilization of laboratory visit-days annually for each of the first 3 years following incidence/index date, and increased outpatient physician visits for years 0–1, 1–2, and 3–4 years. Patients with GCA had significantly more radiology visit-days in years 0–1, 3–4, and 4–5 and more ophthalmologic procedures/surgery in years 0–1, 1–2, 2–3, and 4–5 compared to non-GCA. Emergency medicine visits, musculoskeletal and cardiovascular procedures/surgery were similar between GCA and non-GCA groups throughout the study period.

Conclusions—Direct medical outpatient costs were increased in the month preceding and in the first 4 years following GCA diagnosis. Higher utilization of outpatient physician, laboratory and radiology visits, and ophthalmologic procedures among these patients accounts for the increased cost of care.

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Introduction

Rheumatic diseases are chronic, disabling conditions that generate significant economic burden. In 2003, the total cost attributed to arthritis and other rheumatic conditions in the United States alone was estimated at \$128 billion[1] and is expected to increase to \$225 billion by the year 2020[2]. While healthcare utilization and costs have been studied extensively in rheumatoid arthritis[3] and systemic lupus erythematosus[4], little information is available on the socioeconomic impact of systemic vasculitis.

Giant cell arteritis (GCA) is the most common primary systemic vasculitis among patients aged 50 years[5]. The overall estimated prevalence of GCA among this age group is 1 in 500[5]. Incidence is highest among populations of Northern European origin with estimates between 10–20/100,000 persons 50 years or older[6, 7]. Compared to the general population, long-term mortality in patients with GCA is not significantly increased[6, 8, 9]. However, GCA is associated with significant comorbidities including vision loss, stroke and aortic aneurysm/dissection. Additionally, glucocorticoid-associated adverse events including diabetes mellitus, hypertension, osteoporosis, fracture, infection, glaucoma and cataracts have been reported in 68–100% of patients with GCA[10–12]. Consequently, the combination of disease-specific and treatment-related comorbidities in patients with GCA places a substantial burden on healthcare utilization and medical care expenditures.

Information detailing the socioeconomic impact of GCA has been difficult to obtain due to the relative rarity of this condition, scarcity of well-defined population-based cohorts and the inability to evaluate outpatient cost and utilization from national databases. The aim of this study was to describe the healthcare utilization and direct medical cost of GCA in a well-defined population-based cohort.

Methods

This study was approved by the Mayo Clinic Institutional Review Board (15-000270).

Study population

The study population comprised of a previously described inception cohort[11] of all Olmsted County residents first diagnosed with GCA, as defined by 1990 ACR criteria, between 1/1/1982 and 12/31/2009. Each patient with GCA was individually matched with an age-, sex- and calendar-year matched referent subject without GCA from the same population. Each referent subject was assigned an index date corresponding to the GCA incidence date of their matched patient with GCA. Comorbidities were assessed using electronic diagnostic index and billing codes[13]. An electronic adaptation of the Charlson Comorbidity Index (CCI)[14] was used to assess comorbidities during the period prior to GCA incidence date (or the index date of the referent subjects) through the end of the

matched follow-up. Rheumatologic comorbidities were excluded from the calculation of the CCI.

Utilization Data

Utilization data of outpatient health care resources through the Mayo Clinic Cost Data Warehouse were available from 1/1/1995 through 12/31/2014. Standardized coding was present for all specific items and services provided and were in accordance with the Healthcare Common Procedure Coding System (HCPCS). All resources utilized during the study period were grouped together based on the corresponding Current Procedure Terminology 4th edition (CPT-4), Berenson-Eggers Type of Service (BETOS) and National Uniform Billing Committee (NUBC) codes. Coding was used to objectively assign services into the following categories: laboratory, radiology (plain radiographs, computed tomography, magnetic resonance imaging, ultrasound, nuclear medicine), emergency room visit, outpatient physician visit, musculoskeletal procedure/surgery, cardiovascular procedure/surgery, and ophthalmologic procedure/surgery. Because multiple line-item codes can be involved in the same service or procedure, visit-days were used to evaluate utilized services to prevent overestimation of services provided.

Cost Data

Cost data from the Mayo Clinic Cost Data Warehouse were used to provide estimates of nationally representative unit costs. The database includes line-item detail on the date, type and billed charge for all goods and services provided at each clinical encounter. Comprehensive cost data for patients with GCA and their matched referent subjects were available for all encounters at Mayo Clinic and its affiliated hospitals from 1/1/1987 through 12/31/2014. Unit costing methodology was employed to provide a standardized, inflation-adjusted estimate of cost (2014 dollars) assigned to each service and procedure to reflect a national average cost. Total direct costs included all outpatient and inpatient health care costs incurred, with the exception of prescription drugs, nursing home care, physical therapy, durable medical equipment and medical transportation.

Follow up

Patients in both cohorts were followed until death, migration from Olmsted County or 12/31/2014. When available, cost and utilization data were obtained beginning 12-months prior to the GCA incidence/index date. A maximum of 5 years following the incidence/index date was used for analysis and the follow-up of each matched pair was further truncated at the shortest length of follow-up for either member to ensure similar periods of observation for cases and controls. If less than six years of cost and utilization data were available, the observation period identified for the matched pair was included in the respective year(s) in the aggregate analysis. For example, a pair with incidence/index date in 1983 could contribute one year of cost (1987, year 5) but no utilization data; whereas, a pair with incidence/index date in 1993 could contribute up to 6 years (1992–1997, years -1 to 5) of cost and up to three years of utilization data (1995–1997, years 3–5).

Statistical analysis

Descriptive statistics (means, medians, percentages, etc.) were used to summarize the characteristics of patients with GCA and the referent subjects. Mean costs were reported after trimming the most extreme 5% of values to reduce the impact of outliers on the estimated means. Comparisons of patient characteristics between cohorts were performed using chisquare and rank sum tests. Utilization of selected health care services and costs were compared between GCA and non-GCA cohorts using signed rank paired tests. Selected healthcare services with low yearly frequencies were analyzed categorically (e.g., 0 vs 1 or more) and comparisons between groups were performed using McNemar's tests.

A simple weighted quantile regression method[15], which examines specific percentiles of distribution in relation to covariates, was used to account for censoring, including both administrative censoring and losses to follow-up, as has been previously described[16]. Subjects with complete cost data histories were weighted in this analysis, corresponding to the probability of not having a censored cost data history for the entire 5-years of follow-up. Subjects who died during the follow-up period were considered to have complete, uncensored cost data, since these subjects would not acquire further medical costs. However, patients who were lost to follow-up due to emigration from Olmsted County may have incurred subsequent medical costs which were not available to study. The rationale for using a weighting method in the quantile regression allowed for the distinction between censoring of follow-up time and censoring of cost data[17].

Results

The study population comprised 147 subjects with GCA and 147 age-, sex-, and calendar-year matched referent subjects without GCA. The mean($\pm$ SD) age was similar in both the GCA and non-GCA cohorts. The follow-up of the matched pairs ended with death in 27 GCA and 28 non-GCA subjects. Subjects with GCA were more likely than non-GCA subjects to have peripheral vascular disease (41% vs. 26%; $p=0.005$), and were somewhat more likely to have cerebrovascular disease (42% vs. 33%; $p=0.09$) and peptic ulcer (24% vs. 16%; $p=0.08$) diagnosed prior to incidence/index date or at any time during the first 5 years of the matched follow-up. However, subjects with GCA were somewhat less likely than non-GCA subjects to have myocardial infarction (12% vs. 20%; $p=0.08$). The remaining comorbidities were similar in both cohorts (Table 1).

Health care utilization

The median (interquartile range [IQR]) number of outpatient physician and laboratory visitdays, by year, for patients with GCA and referent subjects are shown in Figure 1 (top panel). The proportion of patients with 1, 2, and 3 or more visit-days per year are shown for radiology (middle panel) and ophthalmologic visits (bottom panel) in Figure 1. During the year prior to the incidence/index date, patients with GCA had a higher median difference (MD) in outpatient physician (MD 3; IQR -2, 7; $p<0.001$) and laboratory (MD 2; IQR -1, 5; $p<0.001$) visit-days and in number of radiology (61% of patients with GCA have at least 2 visit-days vs 43% in non-GCA; $p=0.024$) and ophthalmologic visit-days (54% of patients

with GCA have at least 1 visit-day vs 35% in non-GCA; $p=0.013$) compared to their matched referent subjects.

Following incidence/index date, patients with GCA had a higher median increase in outpatient physician visit-days during the first (MD 7; IQR 2, 14; $p<0.001$), second (MD 1; IQR -1, 8; $p<0.001$) and fourth (MD 2; IQR -2, 6; $p=0.018$) years, but the difference did not reach statistical significance in years three (MD 1; IQR -2, 5 $p=0.08$) and five (MD 1; IQR -4, 5; $p=0.16$). Laboratory visit-days were higher in patients with GCA compared to referent subjects during the first (MD 9; IQR 2, 13; $p<0.001$), second (MD 4; IQR -1, 8; $p<0.001$) and third (MD 2; IQR -2, 7; $p=0.022$) years but the difference did not reach statistical significance in years four (MD 1; IQR -2, 6; $p=0.07$) and five (MD 1; IQR -3, 5; $p=0.33$).

Radiologic visit-days were also higher among patients with GCA compared to referent subjects with significantly higher frequencies in years one (70% of patients with GCA have at least 2 visitdays vs 49% in non-GCA; $p=0.006$), four (54% of patients with GCA have at least 2 visit-days vs 36% in non-GCA; $p=0.028$), and five (58% of patients with GCA have at least 2 visit-days vs 38% in non-GCA; $p=0.023$). Comparisons of the frequency of radiologic visits did not reach statistical significance in years two (53% GCA vs. 40% non-GCA for 2+ visit-days; $p=0.07$) and three (60% GCA vs. 46% non-GCA for 2+ visit-days; $p=0.06$).

Ophthalmologic procedure/surgery visit-days were higher among patients with GCA in years one (65% of patients with GCA have at least 1 visit-day vs 30% in non-GCA; $p<0.001$), two (48% of patients with GCA have at least 1 visit-day vs 33% in non-GCA; $p=0.016$), three (49% of patients with GCA have at least 1 visit-day vs 35% in non-GCA; $p=0.034$) and five (51% of patients with GCA have at least 1 visit-day vs 34% in non-GCA; $p=0.040$). Visit-days for musculoskeletal procedures/surgeries, cardiovascular procedures/surgeries, and emergency medical services were similar between both groups for the entire study period. Due to the sample size and variability of specific services received, comparisons of differences between individual line-item codes among matched subjects were not performed.

Cost

The total median [IQR] direct medical cost (inflated to 2014 dollars) from the year preceding and up to five years following incidence/index date, for both the patients with GCA and referent subjects are demonstrated in Figure 2. The MD for total (inpatient +outpatient) direct healthcare cost between patients with GCA and referent subjects for the entire year prior to incidence/index date did not reach statistical significance (MD \$835; IQR -3255, 5540; $p=0.12$). However, when each month was separately evaluated, patients with GCA had a significantly higher total cost of healthcare (MD \$417; IQR 132, 1646; $p < 0.001$) in the month immediately preceding the incidence/index date. No differences in inpatient costs between GCA and non-GCA subjects were found throughout the entire study period.

Median differences in outpatient costs were significantly higher among patients with GCA annually from the year prior through four years following the incidence/index date (Table 2).

The highest difference in cost observed between groups was demonstrated during the first year (MD \$2085; IQR 571, 4530;p<0.001).

The incremental cost difference between the two groups for total [inpatient+outpatient] (Table 3) and outpatient cost (Table 4) was examined using quantile regression models at different percentiles. Two models were examined. The first model adjusted costs based on age and sex. At the 10th percentile of costs, the incremental cost of care of GCA subjects over the 5-year period following diagnosis was \$2,679 (95% CI:968, 4072) for combined inpatient and outpatient cost and \$902 (95% CI:357, 1648) for outpatient-specific cost of care. The GCA incremental cost increased steadily towards the upper range of cost distribution for outpatient costs, reaching \$10,514 (95% CI:3456, 14947) at the 90th percentile of costs. The incremental cost of care for the combined inpatient and outpatient cost of care increased to \$6,351 (95% CI:422, 10486) at the 50th percentile of costs but then declined in the 75th and 90th percentiles due to the markedly variable cost range of inpatient care seen in both groups. This model suggests that subjects with GCA at the 10th percentile of total costs incurred an additional \$902 of outpatient cost compared to their age-and sex-matched peers and those at the 90th percentile costs incurred an additional \$10,514 of outpatient costs over a 5-year period. In addition to age and sex, the second model adjusted for comorbidities between matched GCA and non-GCA subject pairings using a weighted CCI and also accounted for variability in inpatient care by adjusting for the number of inpatient days during the five years following incidence/index date. Following these adjustments, the incremental outpatient cost of GCA ranged from \$890 at the 10th percentile of costs up to \$7,833 at the 90th percentile over a 5-year period (Table 4).

Further analysis was performed on the subset of matched pairs in which data were available from one year prior through five years following the incidence/index date for utilization (n=52) and cost (n=70). Utilization among those with 6 years of available data was similar in all domains to the larger aggregate analysis that included 6-year and partial follow-up (results not shown).

Discussion

This report comprises the first North American population-based study to evaluate utilization of outpatient services and direct medical cost of GCA from one year prior and up to five years following diagnosis. Our findings indicate subjects with GCA incur substantially higher total cumulative direct medical cost in the month immediately preceding diagnosis and annually for the first four years following diagnosis compared to subjects without GCA.

The utilization and direct medical cost of other rheumatologic diseases including systemic lupus erythematosus[4] and rheumatoid arthritis[3] have been extensively evaluated, but the economic burden of GCA is largely unknown. Although considered a rare condition, the number of incident cases of GCA is expected to concurrently increase with the aging global population. A recent disease projection for GCA estimated that by 2050 more than 3 million people will have been diagnosed with GCA in North America, Europe and Australasia[18]. It is estimated by 2050 the cost of GCA-related complications would markedly increase,

with approximately \$70.6 billion of cumulative cost being spent on visual impairment for patients diagnosed with GCA from 2014–2050 in the United States alone[18].

Beyond disease projection models, limited information on GCA-associated cost is available. One study evaluated the socioeconomic impact of five systemic vasculitides including GCA in New York State using hospital admission data sources[19]. However, only costs attributed to inpatient care were reported, and a population-based comparator cohort was not included for incremental cost assessment[21]. While a marginally greater risk of hospitalization has already been previously described in our cohort[20], our study did not identify a noticeable significant difference in the overall cost of inpatient care between subjects with GCA and non-GCA referent subjects. A potential explanation for this lack of increase is the large variability in inpatient cost among a relatively small patient sample size. These factors may prevent identification of small cost differentials between groups. Furthermore, the majority of care related to the diagnosis and management of GCA in the United States occurs in the outpatient setting.

The findings from the current study suggest that incremental outpatient direct medical cost of GCA is already evident in the year preceding diagnosis. A corresponding increase in utilization of outpatient physician, laboratory and radiology visit-days over the same interval suggests these costs are associated with establishing diagnosis. To our knowledge, no other study has evaluated utilization or cost in the time period leading up to the GCA incidence date. A recent database study by Babigumira and colleagues used a national sample of U.S. administrative medical claims to estimate the cost-of-illness of GCA limited to the year immediately following diagnosis[21]. Similar to the current study, Babigumira et al. found one-year cost was significantly increased among patients with GCA. While inpatient, outpatient and pharmacy costs were all higher among GCA patients, the outpatient cost difference between GCA patients and controls (\$10,389) was two-fold greater than the inpatient cost difference (\$5139); further highlighting the majority of care provided for GCA patients is in the outpatient setting.

A closer parallel to our GCA cohort is a study evaluating patients with isolated polymyalgia rheumatica (PMR) from the same Olmsted County population. In this cohort of patients with isolated PMR, the total yearly direct medical cost was similarly highest in the year of diagnosis[16]. Thereafter cost of care decreased over time, but remained higher than those of comparator subjects. Utilization of outpatient visits and laboratory testing was higher in patients with PMR in the year following diagnosis but thereafter became similar to that of controls. A longer duration of disease and higher number of associated complications may account for the persistent increase in health care utilization and cost among patients with GCA compared to those with PMR.

In addition to outpatient physician visits, laboratory and radiology testing, patients with GCA in the current study had a higher frequency of utilized ophthalmologic surgeries/procedures in four of the five years following diagnosis. These increased services correspond with what is known about visual complications in GCA. Several studies demonstrate visual impairment in up to 20% of patients at or around the time of GCA diagnosis[22, 23] later followed by an increased risk of developing glucocorticoid-associated

ocular disease. Posterior subcapsular cataracts, in particular, have been seen in up to 41% of GCA patients on chronic glucocorticoid therapy[10].

Interestingly, musculoskeletal procedure/surgery utilization was not increased among patients with GCA compared to non-GCA subjects. Although osteoporotic fractures are a well-known and frequent complication of glucocorticoid therapy[10, 24], a direct increased risk of fracture among patients with GCA to age-and sex-matched controls has not yet been quantified. Cardiovascular procedure/surgery utilization was also similar between groups. While a higher baseline prevalence of myocardial infarction in the control subjects may have offset identification of an observed difference, a recent systematic review and meta-analysis has demonstrated that patients with GCA are not at a significant increased risk of coronary artery disease compared to non-GCA comparators[25].

This study has several strengths. First, is utilization of a well-defined, population-based cohort of subjects with GCA with age-, sex-and calendar-year matched comparison subjects. Second, the database employs standardized and uniform coding of line-item services allowing for objective categorization. Furthermore, the database provides an estimated economic cost for each recorded line-item including both the billed charge and true resource use, the latter of which was used to reflect the accurate cost of care. Finally, the value of each unit was adjusted to national cost norms providing an accurate and generalizable estimation of relevant economic cost.

Results from this study should be interpreted in light of some limitations. First, the pattern of utilized services may reflect regional or institutional practices and may differ compared to other areas. Both groups are from the same population, thus it is anticipated that the regional variations in healthcare utilization and cost would be experienced by both cohorts, mitigating the impact of practice patterns on the incremental cost of care observed. Secondly, review of the individual services and cost units did not allow classification of items based on active disease, chronic disease-related complications, or treatment-associated adverse events. Assessing such contributions in future studies would be of benefit.

A further limitation of the study is some subjects were included for only part of the follow-up period. However, since follow-up of each matched pair was truncated at the shortest length of follow-up for either member, duration of observation was similar for both cases and referent subjects, negating the impact of partial contribution on the overall results. Indeed, comparison of patients with 6-year data did not differ for either cost or utilization with the larger aggregate group. While the longitudinal nature of this study is a particular strength, it is possible costs of care may evolve over time as newer healthcare modalities became available (e.g. advanced imaging). Unfortunately due to limited sample size, stratified cost based on calendar year was not feasible. Lastly, the cost database used in this study does not include categories of cost related to outpatient prescription drugs, nursing home or assisted-living fees, durable medical equipment or transportation services. Consequently, the impact of these items is unknown, though not anticipated to substantially contribute to the overall cost of care for GCA.

Although biologic agents were not used in this patient cohort, ongoing research is identifying a potential role for them in the treatment of GCA. While these medications are more expensive, they may lead to fewer disease or treatment related complications. Therefore, future cost analysis of patient populations utilizing such medications will need to be explored.

In conclusion, the direct cost of care for patients with GCA is higher than non-GCA referent subjects beginning one month prior to diagnosis and extending four years following. A higher utilization of outpatient physician visits as well as laboratory, radiology, and ophthalmologic services appears to account for this difference. Further population-based studies evaluating utilization and cost in GCA are needed to confirm findings in larger samples and more diverse communities. Future research will need to address methods of cost-effective care models and the impact of targeted therapeutics in patients with GCA.

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Significance and Innovation

- This constitutes the first population-based study evaluating healthcare utilization and direct medical cost among a well-defined cohort of patients diagnosed with giant cell arteritis.
- Patients with giant cell arteritis utilized more laboratory, radiology, and ophthalmologic procedure/surgery visit-days compared to matched referent subjects, but musculoskeletal and cardiovascular procedure/surgery visit-days were similar.
- The median incremental outpatient cost attributed to GCA over a 5-year period was \$4662.

Figure 1.

Top Panel: Utilization of health care services by visit-day for outpatient visits and labs. Middle Panel: Percentage of patients with 1, 2, or 3+ radiology visit-days (bottom, middle and upper section of each bar, respectively). Bottom Panel: Percentage of patients with 1, 2, or 3+ ophthalmologic visit-days (bottom, middle and upper section of each bar, respectively). Giant cell arteritis patients (GCA) are darker bars and non-GCA referent subjects are lighter bars. Sample sizes for both groups were 89, 92, 93, 83, 74 and 71 at -1, 1, 2, 3, 4 and 5 years, respectively.

Figure 2.

Direct medical costs by years of follow-up (inflation adjusted to 2014 dollars) for patients with giant cell arteritis (solid diamonds) and non-GCA referent subjects (open circles). Sample sizes for both groups were 127, 133, 120, 110, 99, 97 at -1, 1, 2, 3, 4 and 5 years, respectively.

Table 1

Characteristics of patients with giant cell arteritis and matched referent subjects

	GCA subjects (n=147)	Non GCA subjects (n=147)	p-value
Female, no. (%)	118 (80)	118 (80)	1.00
Age, mean $\pm$ SD, years	77.2 $\pm$ 8.2	76.9 $\pm$ 8.5	0.85
Comorbidity type, no. (%) [‡]			
Myocardial infarction	18 (12)	29 (20)	0.08
Congestive heart failure	40 (27)	43 (29)	0.70
Peripheral vascular disease	61 (41)	38 (26)	0.005
Cerebrovascular disease	62 (42)	48 (33)	0.09
Dementia	23 (16)	27 (18)	0.53
Chronic pulmonary disease	53 (36)	60 (41)	0.40
Peptic ulcer	35 (24)	23 (16)	0.08
Diabetes mellitus	27 (18)	35 (24)	0.25
Hemiplegia	5 (3)	7 (5)	0.56
Moderate/severe renal disease	26 (18)	30 (20)	0.55
Liver disease	10 (7)	15 (10)	0.30
Any Cancer	70 (48)	76 (52)	0.48
Charlson comorbidity index [*] , mean $\pm$ SD	4.4 $\pm$ 3.8	4.4 $\pm$ 3.7	0.73

[‡] Comorbidities diagnosed either prior to GCA incidence (or index date for the non-GCA subjects) or at any time during the first five years of the matched follow-up.

^{*} Rheumatologic comorbidities were excluded.

Table 2

Excess healthcare outpatient cost related to giant cell arteritis (inflation-adjusted to 2014 dollars) *

Time from incidence date (years)	Number of GCA/non-GCA pairs	Median Difference (IQR)	Mean Difference ($\pm$ SD) **	p-value *
-1 – 0	127	722 (-1144, 2772)	756 ($\pm$ 342)	0.01
0 – 1	133	2085 (571, 4530)	2432 ($\pm$ 412)	< 0.001
1 – 2	120	437 (-1365, 3721)	1182 ($\pm$ 370)	0.009
2 – 3	110	382 (-801, 2615)	998 ($\pm$ 361)	0.007
3 – 4	99	388 (-923, 2997)	797 ($\pm$ 365)	0.04
4 – 5	97	577 (-1488, 2893)	493 ($\pm$ 431)	0.11

* signed rank paired test;

** due to cost variability trimmed means were utilized reduce impact of extreme outliers on estimated means

Table 3

Total (inpatient + outpatient) direct medical costs of care for subjects with giant cell arteritis over a 5-year period *

Percentile	Model 1 ^ψ	Model 2 [‡]
10 th	2679 (968, 4072)	1018 (82, 1973)
25 th	2909 (1135, 5016)	1400 (−865, 3167)
50 th	6351 (422, 10486)	3576 (635, 6140)
75 th	5431 (−6156, 19302)	6012 (2258, 10136)
90 th	−7187 (−34065, 16335)	7530 (−124, 14216)

* values are the total incremental costs (95% confidence intervals) according to cost-percentiles for patients with giant cell arteritis compared to referent subjects, inflation-adjusted to 2014 dollars compared to referent subjects

^ψ Adjusted for age and sex

[‡] Adjusted for age, sex, weighted Charlson index and number of inpatient days

Table 4

Direct outpatient cost of care for subjects with giant cell arteritis over a 5-year period *

Percentile	Model 1 ^ψ	Model 2 [‡]
10 th	902 (357, 1648)	890 (173, 1594)
25 th	1902 (566, 2953)	2399 (1210, 3382)
50 th	4227 (1960, 6162)	4662 (1903, 7139)
75 th	9393 (5570, 11614)	7668 (5845, 9564)
90 th	10514 (3456, 14947)	7833 (3275, 14357)

* values are the total incremental costs (95% confidence intervals) according to cost-percentiles for patients with giant cell arteritis compared to referent subjects, inflation-adjusted to 2014 dollars

^ψ Adjusted for age and sex

[‡] Adjusted for age, sex, weighted Charlson index and number of inpatient days